AN EVALUATION OF EXPANDED METAL GLARE SCREEN ON THE NEW JERSEY CONCRETE MEDIAN BARRIER

By

Edgar J. Hellriegel
Principal Engineer, Transportation Research

February 1978

Final Report

New Jersey Department of Transportation
Division of Research and Development
Bureau of Structures, Materials and
Applied Mechanics Research

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NOTICE

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16. Abstract

This report is an evaluation of the experimental use of expanded metal mesh as a glare screen. The installation consisted of several types of mesh of slightly varying heights mounted on the concrete median barrier, Route 22, Scotch Plains, New Jersey. A description of the designs, methods of installation, observation and accident statistics are presented.

Nighttime observations supported by motion pictures demonstrate the reduction in headlight glare while favorable letters sent to the department by motorists attest to the increased driving comfort level.

The decrease in the nighttime accident rate although of weak statistical significance indicates that the glare screen is effective in reducing accidents.

The glare screen did not act as a snow fence or collect litter nor was it damaged by loose tarps, ropes, etc.

Although two systems are available for immediate implementation another installation of greater magnitude for comparative analysis is recommended before incorporation into the standard construction details.

It further recommends development of warrants for the placement of glare screening for medial or other locations.

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TABLE OF CONTENTS

I. SUMMARY

One of the chief factors contributing to nighttime accidents is headlight glare. Glare not only reduces the sight distance but interferes with object visibility as well.

The reduction of headlight glare, therefore, would be extremely beneficial to motorists in the state of New Jersey due to the extremely close placement of the barrier to the traveled day.

In February, 1974 the Division of Research and Development proposed to investigate the use of an expanded metal mesh glare screen as an experimental feature in center barrier construction.

The installation on Route 22 consisted of several types of mesh and materials of slightly varying heights mounted on the 32" concrete median barrier at Scotch Plains, New Jersey.

Daytime and nighttime observations supplemented by motion pictures were conducted over a 2 1/2 year period. Routine inspections of the test site were made for accident damage, litter collection, snow accretion and weatherability of the materials of construction.

The decrease in the nighttime accident rate although of weak statistical significance indicates that the glare screen can be effective in reducing accidents.

Nighttime observations supported by the motion pictures demonstrate the reduction in headlight glare. Letters sent to the Department by motorists attest to the increased driving comfort.

Although two systems are available for immediate implementation another installation of greater magnitude for comparative analysis

is recommended before incorporation into the standard construction details.

It is also recommended that a study be initiated for development of warrants for the placement of glare screening.

II. CONCLUSIONS

It is concluded that in general the use of unflattened expanded metal mesh as a glare screen effectively reduces headlight glare. Screens designed to block out light from opposing headlights up to an angle of 20 degrees in relation to the centerline of the roadway (cut-off angle) work well on tangent sections; horizontal curvatures require increased cut-off angles to provide the same order of glare protection. Experience shows that a screen having the ability to block out glare up to 33 degrees should be effective for the maximum horizontal curvature on any mainline pavement in the state.

In regard to the specific objectives of this study, the following is concluded:

1. The 14 inch screen does effectively reduce headlight glare without blocking the sight distance on a compound curve of 2000, 2875, and 2400 foot radii. Since three inches of overlay could be added to a highway pavement without encroaching on the lower sloping face of the concrete median barrier, the height of the screen should be increased to no less than 16 inches and preferably 18 inches for long term efficiency. On curves where the

line of sight would provide less than a 475 foot stopping distance, the screen could be lowered to 14 inches.

2. The glare screen does not act as a snow fence and cause an abnormal accretion of snow along the barrier in a narrow median. However, as an unsought plus it did prevent slush from being splashed over the barrier into the windshields of opposing traffic.

3. The glare screen does not collect litter which could affect driver attention and cause adverse driver reaction.

4. The glare screen was not damaged from loose tarps, ropes, etc.

5. It is feasible to install one or more types of glare screen on the concrete median barrier. The statistical analysis and decrease in nighttime accidents after installation of the glare screen indicates it to be effective in reducing accidents.

6. The increased driver comfort level is attested to by the favorable letters, pictures, and nighttime observations.

The installation of the many types of screening of various materials resulted in two potential candidates for immediate implementation. In order of preference, first choice would be the thin line post system as designed by Department personnel and shown in Appendix B. This system sustained no damage from barrier impacts at the test site, is sturdy, non-rusting, and permits cross-barrier vision at 90° or greater degrees. This system may be fabricated of either aluminum or galvanized steel. Second would be the DRC system as shown in Appendix C. This would have to be fabricated from galvanized steel with the adoption of galvanized threaded rods for the line posts placed on 5' - 0" centers.

III. RECOMMENDATIONS

1. The height (LWD) of the mesh screen for installation on top of the Department's standard 32 inch concrete median barrier should be 18 inches.

2. The cut-off angle should be increased to greater than 22 degrees to accommodate horizontal curves.

3. A longer installation of at least one mile should be planned immediately to evaluate the benefits of two different strand widths and distance between strands (diamond pattern) versus the DRC screen. This would be a comparison of a 33 + degree cut-off angle versus 180 degree block out.

4. Develop warrants for the placement of glare screening on both steel and concrete median barriers and for berms (right of traffic flow) separating different roadways.

IV. INTRODUCTION

In February of 1974, the New Jersey Department of Transportation proposed an investigation of an expanded metal glare screen mounted on the standard 32 inch concrete median barrier. Preliminary anti-glare screen design criteria had been formulated and investigated by previous researchers over the past decade. Most installations, however, were on steel W beam barriers which would not present the same problems as a glare screen mounted on the New Jersey barrier.

The purpose of this research, therefore, was to substantiate the previous design criteria and determine the following:

1) Does a 14" screen (46 inch overall height) effectively reduce glare without blocking sight distances on curves?

2) Does a glare screen act as a snow fence and cause an abnormal accretion of snow along the barrier?

3) Does a glare screen collect litter (paper, rags, leaves, etc.) which could affect driver attention and cause adverse driver reaction?

4) Would a glare screen be subject to an inordinate amount of damage due to loose tarps, ropes, etc. from passing vehicles and vice versa?

5) Is it feasible to install a glare screen on a concrete median barrier?

6) Is safety and driver comfort level affected by a glare screen?

The use of expanded metal mesh as a glare screen was tested over a decade ago. One of the earliest installations was a 2.7 mile section in the state of Pennsylvania on Interstate I-76. Since then many other states have installed test sections ranging from 500 to 20,000 feet. These installations varied from free standing screens to median barrier mountings on box beam, W beam, I beam, wood and various configurations of concrete walls.

The expanded metal material has been steel or aluminum with coatings of paint, epoxy, polyester and galvanizing singly or in various combinations. The screen heights varied from two to four feet (49 - 59 inches above the pavements); the lengths from 12'6" panels to 100 foot coils.

From the standpoint of traffic operations there have been no reports indicating any detrimental effects due to a glare screen installation. "Studies of speed and lateral placement characteristics jointly conducted with the Bureau of Public Roads, both before and after the installation, did not indicate any disturbance to the traffic stream."[(1)]

Accident studies have shown conflicting results. An English report shows the glare screen increased the accident frequency.[(2)] Accident analysis studies in this country have indicated results to be both statistically and not statistically significant at various levels of confidence. The overall picture, however, showed reductions in the number of nighttime accidents or accident frequency when compared to control sections.

V. STUDY PROCEDURE

A. SELECTION OF TEST SITE

An eleven hundred foot horizontal compound curve on U.S. 22 in Scotch Plains was selected as a test site for the evaluation (Figure 1). This location had the effect of shining the headlights of the eastbound vehicles directly into the eyes of the westbound motorists. Furthermore, the roadway is densely bordered by trees with no commercial or street lighting. In inclement weather the wet barrier displays very little diffuse reflectance and in conjunction with the oncoming glare, the barrier is practically invisible to motorists.

Figure 1 - Test Site

B. DESIGN OF INSTALLATION

To be effective a glare screen must block out all glare from opposing headlights up to an angle of about 20 degrees in relationship to the centerline of the highway, beyond that angle glare is not usually objectionable.(3) Roadway width, median width and horizontal curvature are the main factors in establishing the upper and lower edges of the screen and the cut-off angle. Horizontal curves require angles greater than 20 degrees to provide the same degree of glare protection as on straight sections. In order to make the evaluation, the plan originally called for 1000 lineal feet of expanded metal glare screen to be mounted on the concrete median barrier, however, different types of screening were added at later dates bringing the total length of the installation to 1530 feet.

The concrete median barrier in the State of New Jersey may be built in 15, 20 or 30 foot lengths. A standard nominal 10 foot panel, therefore, would permit utilization on any of the aforementioned lengths.

In one of the investigations in another state, it was noted that the daytime accident rate increased after installation of the glare screen. The increased rate occurred on the convex side of a W beam median barrier installation which was on a horizontal curve having approximately a 2300 foot radius. It was hypothesized that the glare screen changed the sight distance and that the vehicles and/or stoplights were no longer as distantly visible. If this were an actuality then visibility of the roof tops over the screen might

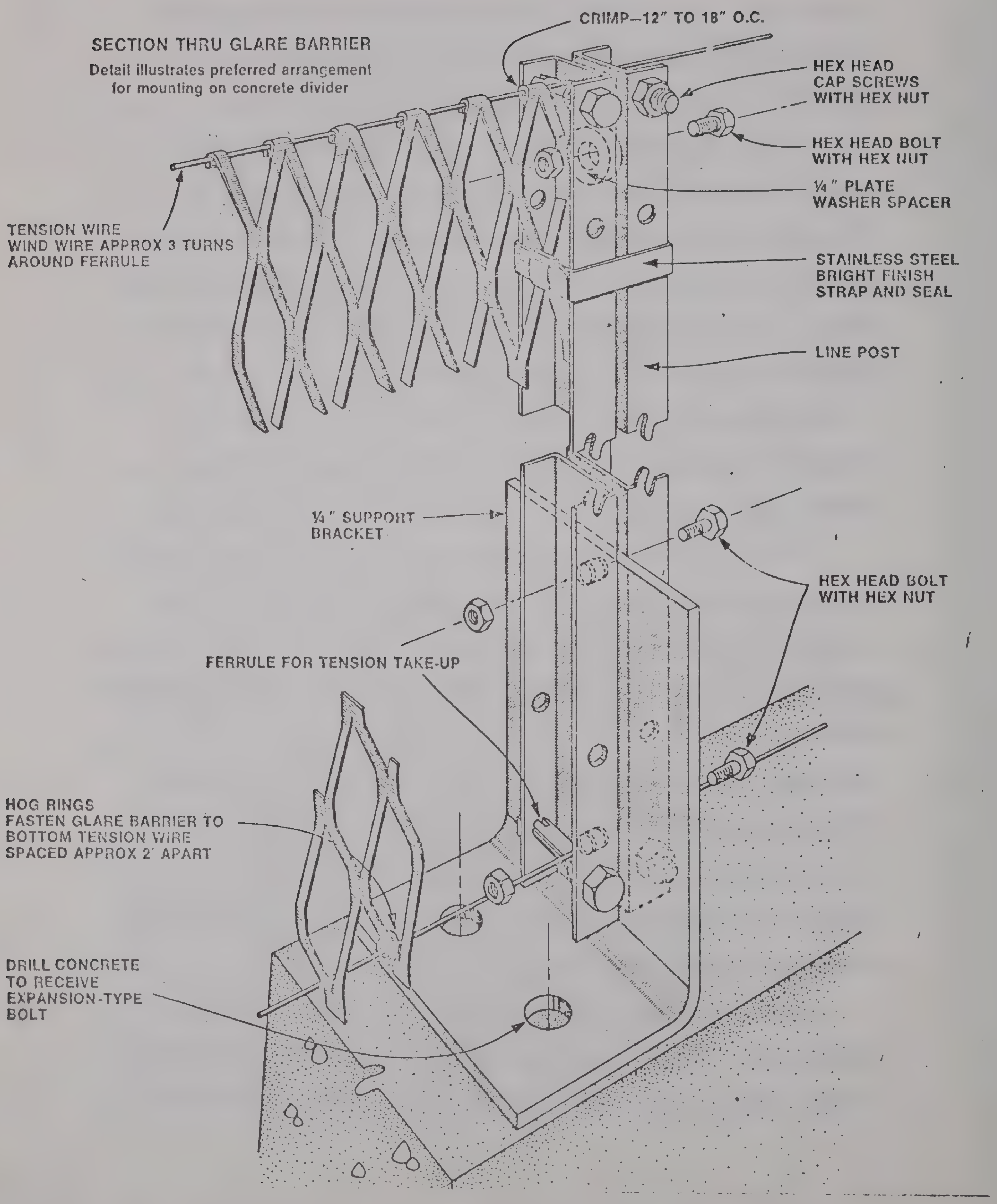
be beneficial. In checking roof line heights in several parking lots it was determined that a driver could readily see the car roofs over the 14 inch screen (46 inch overall height).

One of the leading manufacturers of expanded metal was to supply their glare screen system for the New Jersey evaluation. Their smallest expanded metal mesh panel was 28 inches in height, therefore, it required a special run to provide the specified 14 inch height. For some inexplicable reason the company representative reported that they couldn't produce the 14 inch size but that a 12 inch screen could be provided. By the time the screen was delivered, the height, due to the shop curled top edge had been reduced to 11 1/2 inches.

The following description of the expanded metal glare screen system used is provided for the reader who is unfamiliar with the hardware involved. The screening material is an unflattened expanded metal mesh panel of 18 gauge galvanized steel having electrostatically sprayed and baked coatings. The expanded mesh forms a 1.33 x 4.0 inch diamond pattern with a 0.25 inch strand width and is curled along one edge (see Figure 2). The twist imparted to the strands in manufacturing will block out light normal to the strands. This cut-off angle effectively shuts out light up to 20 - 22 degrees for a mesh of the above dimensions.

The first step in erection of the glare screen is to anchor brackets to the barrier on 10 foot centers. Fifteen inch line posts are then bolted to the brackets; next 2 wires (top and bottom) are

Figure 2 *



* Wheeling Highway Modular System Glare Barrier, Wheeling Corrugating Co., Wheeling, West Virginia, p. 15.

strung between take-up bolts located on the line posts. The mesh panel is hung on the top tension wire by the shop curled edge which is then crimped at 12 to 18 inch intervals. The panel is hog ringed to the bottom wire at 2 to 3 foot intervals and the ends are strapped to the line posts with stainless steel bands.

The researchers were concerned that the 4 3/4 inch width of the L bracket for mounting the line posts was too wide and could readily be struck by a wrap around bumper as a vehicle encroached on the upper sloping face of the barrier. The manufacturer, however, could not furnish a more suitable bracket.

C. EVALUATION METHODS

Daytime and nighttime observations were conducted over a 30 month period supplemented with both motion and still pictures for a graphic record.

Before and after accident data were examined in order to determine the effect of the glare screen on accident experience.

Reporting consisted of an installation report (Appendix A) and a final report at the completion of the evaluation. Significant problems or findings were included in the quarterly reports as part of Project #7799, Experimental Features in Construction, Category II.

VI. DISCUSSION AND RESULTS

A. INSTALLATION

Installation of the main section of glare screen was started May 13 and completed on May 15, 1974. One thousand and twenty feet (102 modules) were installed in 59 man hours at a cost of $7.65 per lineal foot. Eight modules were reserved for repair work. There were several problems encountered on the project but they were rapidly solved. A complete discussion of the original installation with the inherent faults can be found in Appendix A.

After the initial installation effort several other systems were tested as they became available. A two hundred and fifty foot section (25 modules) as designed by Department personnel was added to the original length of screen. This system (See Appendix B) incorporated the originally proposed 14 inch height, did away with the objectionable L bracket, needed less tensioning of the wires and permitted a controlled uniform height off the barrier. Four of the panels were coated with a fluoropolymer (polyvinylidene fluoride). Another steel company seeking to enter the market subsequently supplied five sections of screening of various materials, three of a novel construction whereby the screening was tack welded to a light frame which was simply bolted to the line post negating the need for tension wires.

The last experimental screen to be placed consisted of a 200 foot section of a double reverse corrugated metal fabric. One hundred feet each of aluminum and pre-galvanized steel fabric was installed

on 5, 6.25 and 10 foot centers using various line posts and types of anchorage (See Appendix C). This system required no tension wires and was simple to install. This type of panel would have the thinnest configuration since the post consists of a threaded galvanized pipe slipped through one of the corrugations and screwed into the nipple anchored in the concrete barrier. However, there have been failures in the pipe type post and the manufacturer is changing to a threaded rod.

B. OBSERVATIONS

1. All the screening placed at the test site effectively reduced headlight glare. The original screening supplied by Wheeling was the least effective due to the one quarter inch strand width and the one and one half inch clearance between the screen and the barrier. Both of these factors were responsible for the slight penetration of light from opposing headlights, as can be seen in the night motion pictures taken at the Rt. 22 site. On rainy nights it was also observed that some light coming through the screen-barrier aperture reflected off the water film on the top of the barrier.

2. The concern for the width of the L bracket proved to be real. In four of six encroachments on the barrier, the L bracket was contacted by the vehicle. This resulted in damage not only to the bracket(s), the screen(s), and the tension wires but caused spalling of the concrete barrier by the anchor bolts, (See Figure 3). Contrarily, there were three hits on the barrier within the boundaries of the thin line post system (Appendix B) without causing any damage to the glare screen (See Figure 4).

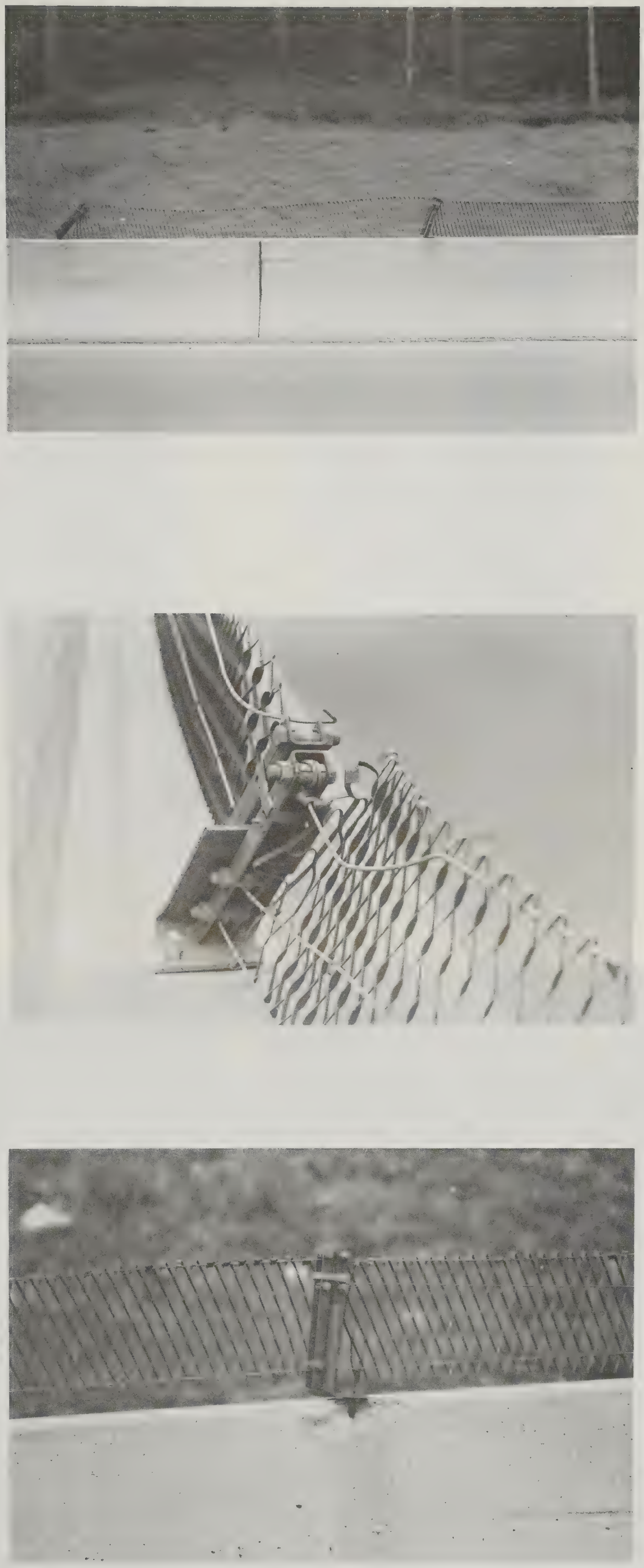


Figure 3 - Glare Screen Impact Damage Associated with L Bracket.

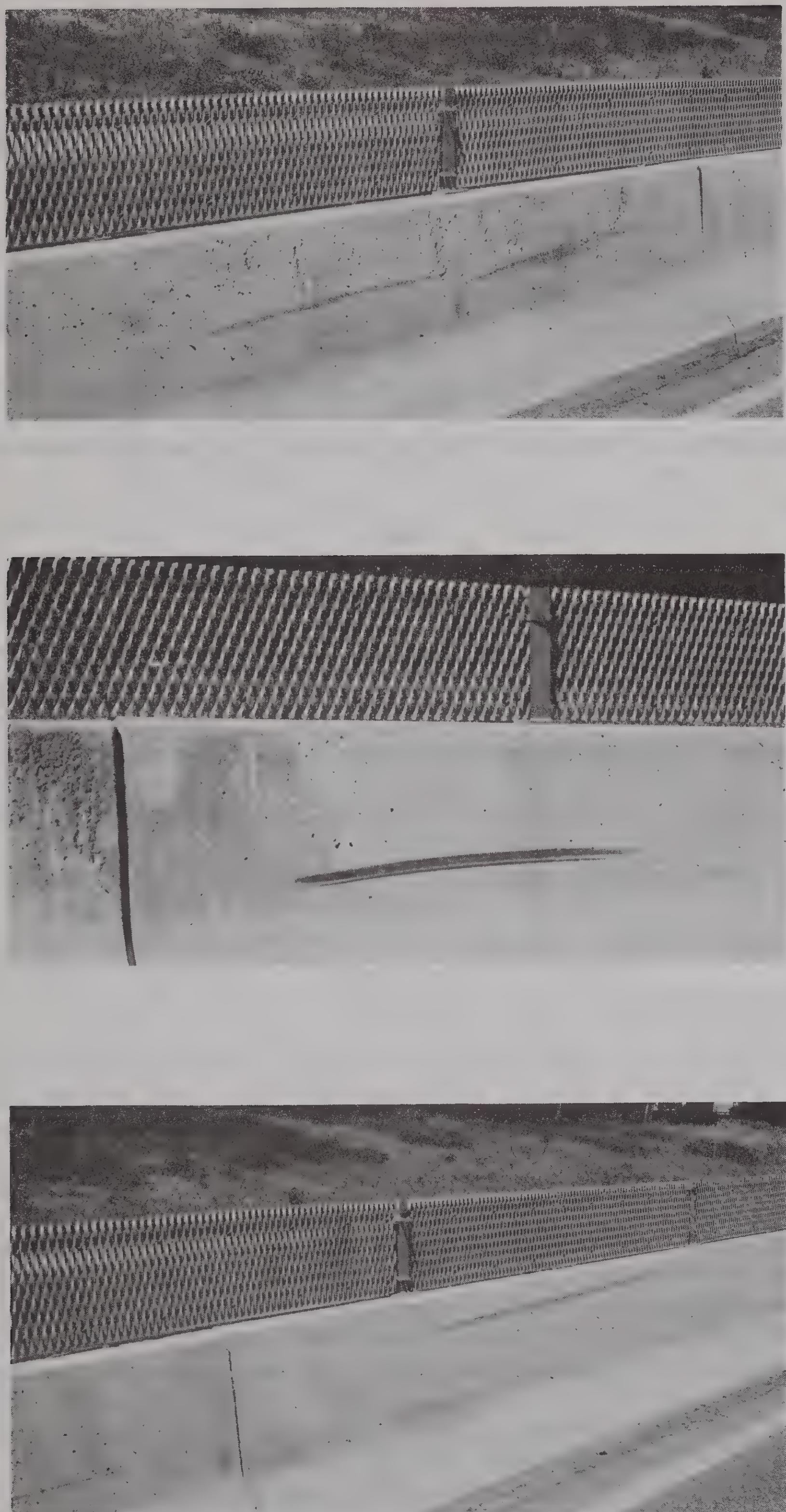


Figure 4 - Barrier Impact Without Damage To Thin Line Glare Screen System.

3. Daytime observation of vehicles in the westbound lanes were made from a vehicle parked in the inside eastbound lane. The overall height of the glare screen was 44 inches - two inches below the original desired height. All of the roof lines of 491 passenger cars were visible with no detection of headlights. Of the 172 trucks, 77 had headlights at least partially visible for an 88% overall efficiency.

Another observation was made after installation of the 14 inch screen. Unfortunately an overlay had been placed in the area which changed conditions. It was decided to wire a 16 inch screen to one of the adjacent 14 inch screens and make simultaneous readings. The overall heights were 45 and 47 inches, respectively. Traffic volumes for a one half hour count in the westbound lane was 548 cars, 128 trucks and 2 buses. All the car roofs were visible over the 14 inch screen and approximately 88 percent over the 16 inch screen. The 16 inch screen (47 inch overall height) however, blocked out 100 percent of the headlights; while the 14 inch screen (45 inch overall height) was 92 percent effective. In order to achieve the original aim a 46 inch height was synthesized by attaching a strip of wood along across the top of three of the panels at the aforementioned height. A total of 587 vehicles were observed during a half hour period. Of 460 cars, 15 of the car roofs were not visible while the headlights of 14 of the 127 trucks were totally or partially seen. This height blocked out 97.6 percent of the headlights.

The following is a summary of these observations:

Top of Screen To Pvmt.	Number of Trucks	Number of Cars	Car Roof Vis.	Headlights Visible Cars	Headlights Visible Trucks	Percent of All Headlights Blocked Out
44"	172	491	100%	0	77	88.4
45"	130	548	100%	0	54	92.2
46"	127	460	97%	0	14	97.6
47"	130	548	88%	0	0	100.0

Since the lower vertical face would permit two 1 1/2 inch overlays to be placed it may be prudent to specify an 18 inch glare screen on new installations. Although the additional two inches in height of the 18 inch screen would decrease the percentage of car roofs visible the mix of vehicles would be such that the daytime line of sight would not be seriously compromised.

4. During the many trips to the test site the only material observed caught in the screening was one leaf and a small strip of plastic film. As for acting as a snow fence, there was no greater discernible accretion of snow in the area of the glare screen. One benefit not anticipated was that the glare screen acted as a shield and blocked or deflected the slush being thrown across the median into the opposing traffic lane.

5. All the components in the various glare screens were acutely examined for the effects of weathering. Exposure varied from 1 to 3 years. There was no rusting observed. The Wheeling screening had the longest exposure (3 years) and had the slightest

trace of staining in the drip line. The pre-galvanized mesh looked equally as good as the hot dipped galvanized (2 years). The steel line posts which exhibited rusting at the weldments at the time of installation were touched up with a cold galvanizing spray and remain unchanged (2 years). There has been no rust staining on the concrete barrier to date. The fluoropolymer coated mesh (2 years) did not reveal any self-cleaning ability to promote delineation. It was also noted that the heat treatment to cure the coating caused a slight warping of the mesh. The double reverse corrugated pre-galvanized fabric (1 year) looked good at the time of the examination, however, at least one more winter of weathering and observation will be necessary before making the final evaluation. The aluminum sections on the 10 foot spacings were showing fatigue failure at the posts.

C. ACCIDENT STATISTICS

A nighttime accident analysis was made at the location of the glare screen and the adjacent areas. The section with the glare screen was between the two control sections. Each section was three-tenths of a mile in length. The nighttime accidents consist of single vehicle fixed object accidents and two vehicle same direction accidents. Accident records were divided into two 28 1/2 month periods, one before and one after erection of the screening. The following data was used to statistically test the effectiveness in reducing accidents.

	Section With Glare Screen		Sections Without Glare Screen		
	Number of Accidents	Percent of Total	Number of Accidents	Percent of Total	Total Accidents
Before	18	35.3	33	64.7	51
After	8	21.6	29	78.4	37

The table shows that the test section was responsible for 35.3 percent of the accidents before the glare screen was installed and 21.6 percent afterward. Was the reduction due to the screen or chance? Assuming the 35.3 percent figure represents the expected percentage of accidents in the test section, the normal approximation of the binomial distribution was used to calculate the probability of obtaining the 21.6 percent (or equally deviant in the opposite direction) value. This probability turned out to be approximately 12 percent which corresponds to an 88 percent confidence level. This confidence level which could be termed "of weak statistical significance," shows some indication that the glare screen is effective in reducing accidents.

As seen in the table, there was a reduction in the nighttime accidents along the section protected by the glare screen. In contrast, one of the adjacent control sections (also a compound curve) had an increase in accidents during the "after" period.

This decrease in nighttime accidents coupled with the favorable letters from the motoring public and the comments of the

Scotch Plains police attest to the success of a glare screen. From the night pictures, observations and public opinion the glare screens definitely reduce or eliminate headlight glare, thus increasing the night driving comfort level.

REFERENCES

(1) Coleman, R. R. and Sacks, Wm. L., "An Investigation of the Use of Expanded Metal Mesh As An Anti-Glare Screen", Highway Research Record 179, Highway Research Board, 1969, pp. 68-73.

(2) Modern Transport, Terminal House, Shepperton, Middlesex, England, Vol. 93, No. 2398, May 15, 1965, p. 32.

(3) Hofer, Rudolph Jr., "Glare Screen for Divided Highways", Highway Research Bulletin 336, Highway Research Board, 1962, pp. 95-101.

New Jersey Department of Transportation

MEMORANDUM

TO MEMORANDUM OF RECORD

FROM Mr. E. J. Hellriegel
Principal Engineer,
Transportation Research

SUBJECT Glare Screen Installation, Route 22, Sections 11H, 12E, 13D Job #268 Stations 676+28 to 686+48

DATE June 24, 1974

The above referenced project was started on May 13 and completed on May 15, 1974. One thousand twenty feet (102 modules) were installed in 59 man hours. The eight modules and hardware reserved for possible replacement are stored at the Morris Avenue yard in Union.

I. INSTALLATION

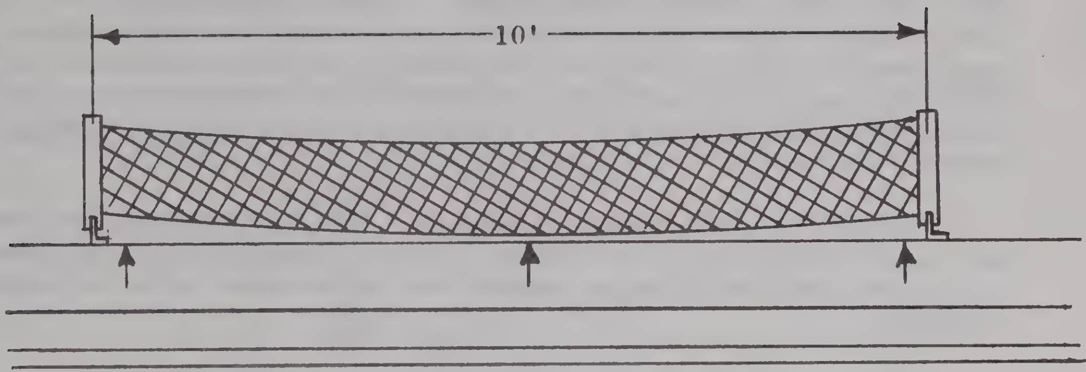
From a pre-erected test in the garage of the Consolidated Fence Company, it was found that when tension was applied to the upper wire the L-shaped support bracket would bend throwing the line posts out of plumb. This testing was done for two reasons, (1) to prove that Wheeling's instructions (on this job) to disregard the diagonal cross bracing at every fifth module was grossly in error, and (2) that in their recommended practice of cross bracing, should any one of the upper tension wires or the diagonal cross bracing fail, the line posts brackets within any given five module installment will bend out of plumb. Consolidated had to modify the line posts by drilling the necessary holes to allow for the cross bracing.

A. Line Post Anchorage

The half inch Hilti Kwick-Bolt used to anchor the line post bracket caused spalling in three places. The reasons appear to be twofold: (1) the Kwick-Bolt which has a tapered lower section exerts pressure on a split ring as the nut is brought down. The split ring then wedges against the sides of the hole in the concrete. When randomly placed in the drilled hole in the concrete barrier, spalling occurred. Using a determined orientation with the solid sections of the split ring placed in the longitudinal direction of the barrier, no further spalling took place; (2) the present line post bracket requires the holes for the Hilti anchor to be drilled too close to the face of the barrier.

B. Screen Height

The specified 14 inch height could not be delivered so an 11 1/2 inch height was accepted. This would have theoretically placed the lower edge of the glare screen 2 3/16 inches above the barrier top. Our original desire was to be preferably 3/4 - 1 inch above the barrier to prevent light from coming under the screen. By placing the wire under rather than over the tension take-up ferrule we reduced the distance to approximately 1 5/8 inches. The writer still considers this to be too large an aperture. Sixty measurements were made randomly on the installed modules. Three measurements were made per module, two near the line posts and one at the center.



Precision
$\pm$ 1/16"

Average	1 5/16"	7/16"	1 3/8"
Range	(1 - 1 5/8)	(0 - 7/8)	(1 1/4 - 1 1/2)

From the sag in the center it is readily seen that this system could not perform at the 3/4 - 1 inch maximum clearance at the line post.

Sitting in a 1968 Ford sedan parked in the inside lane, observations of headlight heights (daytime) were recorded on vehicles in both lanes of the opposing westbound traffic over a one hour period.

CARS	TRUCKS		
Couldn't See	Couldn't See	Can See	1/2 Headlight
458	72	16	61

Of the 458 cars, all roof tops were visible with no detection of headlights. On the 61 truck count it appeared that the recommended 14 inch height would have placed this number of vehicles into the couldn't see column and reduced the can see to partial visibility. These few trucks (16) were comprised of dump trucks and car carriers. It is calculated that the 11 1/2 inch height screens out 87 percent of the headlights and that the 14 inch height would screen out approximately 97 percent.

II. NIGHT OBSERVATION

Traveling both inner and outer lanes in both directions there is a considerable decrease in headlight glare (best estimate is 90 percent). The difference is quite apparent when viewing vehicles before and after the glare screen installation. Traveling westbound, the convex side of radius appears slightly more effective than the concave (eastbound) side. Since this had been placed on a curve having a 2800 foot radius the normally anticipated 22 degree blockout has been decreased to approximately 17° permitting some light penetration through the screen.*

Aside from the screen evaluation, in-house produced delineators were attached to the glare screen. Again traveling in both lanes in both directions observation showed the delineators to be strikingly effective.

III. CONCLUSIONS

1. The glare screen is effective in reducing headlight glare and increased the driver comfort level.

2. The glare screen permits effective use of delineators.

3. The recommended height would permit the car roofs to remain in line of sight around a sharp radius and still be at least 90 percent effective in obscuring on-coming headlights.

IV. RECOMMENDATIONS

1. The Wheeling system must be modified to correct several deficiencies before it would be recommended for another installation.

2. The FHWA should not permit the allocation of Federal funding for use with the CMB until these modifications are made.

3. To build and evaluate an aluminum glare screen eliminating all the deficiencies present in the Wheeling system.

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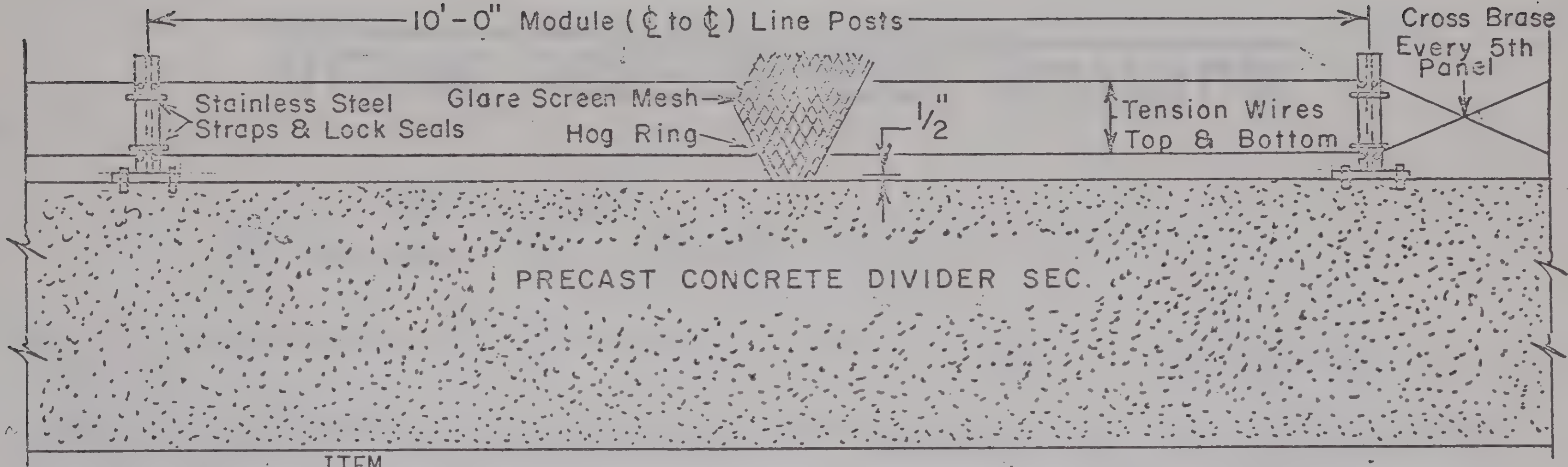
*This sentence should have read; Since this had been placed on a compound curve having a 2000 foot radius the normally anticipated 22 degree blockout has been decreased approximately 1.78 degrees permitting some light penetration through the screen.



ITEM

EXPANDED METAL PANEL
9' 9-1/2" SWD X 13-7/8" LWD, .081 aluminum, .375" strand width, 1.33" X 3.0" center to center of bridges, machine run SWD, closed diamonds, no prongs

SUPPORT POST
6061 aluminum std. I section 1-1/2"X2-1/2"X1/8" shield arc gas method 3/8" fillet weld to 6"X 4"X 3/8" 6061 aluminum base plate

TENSION WIRE
PVC coated #9 ga. pre-galvanized steel wire core, crimped to retain tension

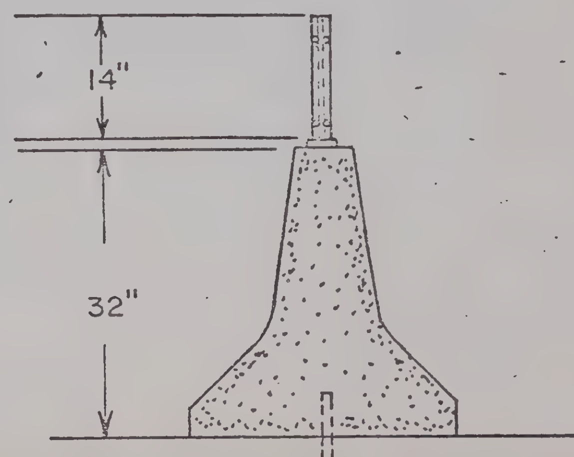
HOG RING
PVC coated #11 ga. pre-galvanized steel wire core

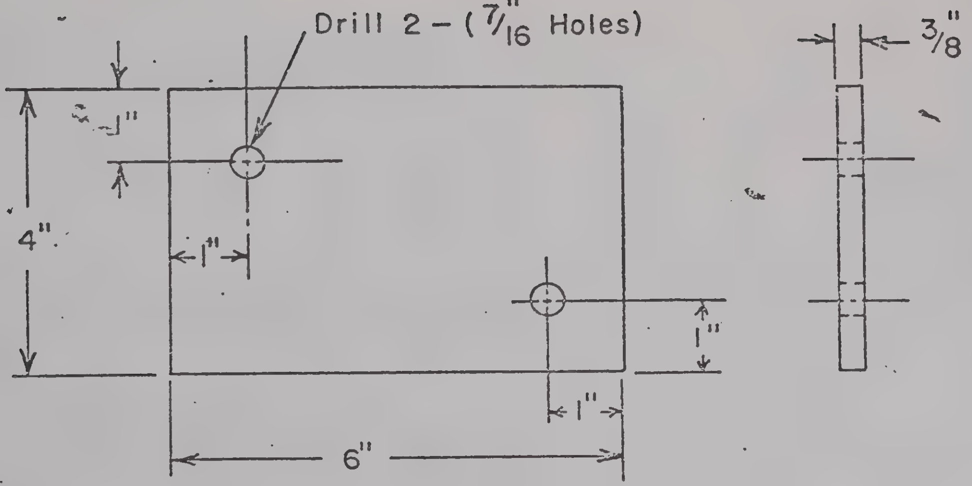
BOLTS & NUTS FOR TENSION WIRE TAKE-UP
Hex head machine bolt 1/2" diameter X 2-1/4", with hex head, 3/16" hole drilled thru stem, self locking hex head nut

STAINLESS STEEL STRAPS & LOCK SEALS
Straps .020"X .625" coil strip No. 1 or 2 finish seals .020"X 1.25" single crimp

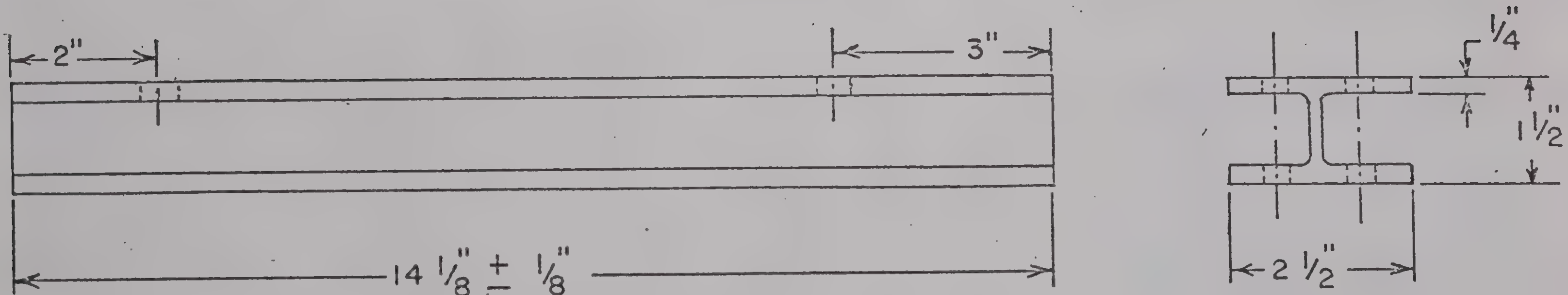
POST ANCHOR BOLTS
3/8"- 16 X 3" parabolts unbar plated

SPACERS
6" aluminum channel section 1"X 1/2"X 1/8" with 6"X 1"X (1/8"-1/4") shims



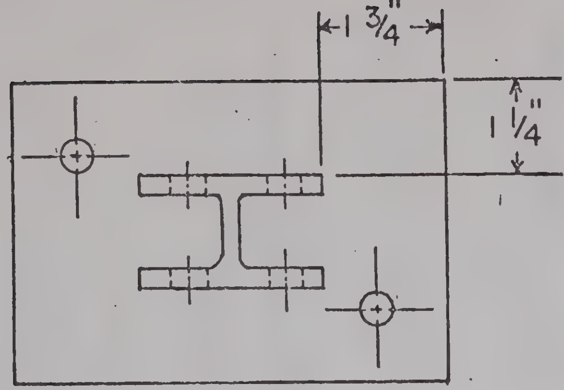


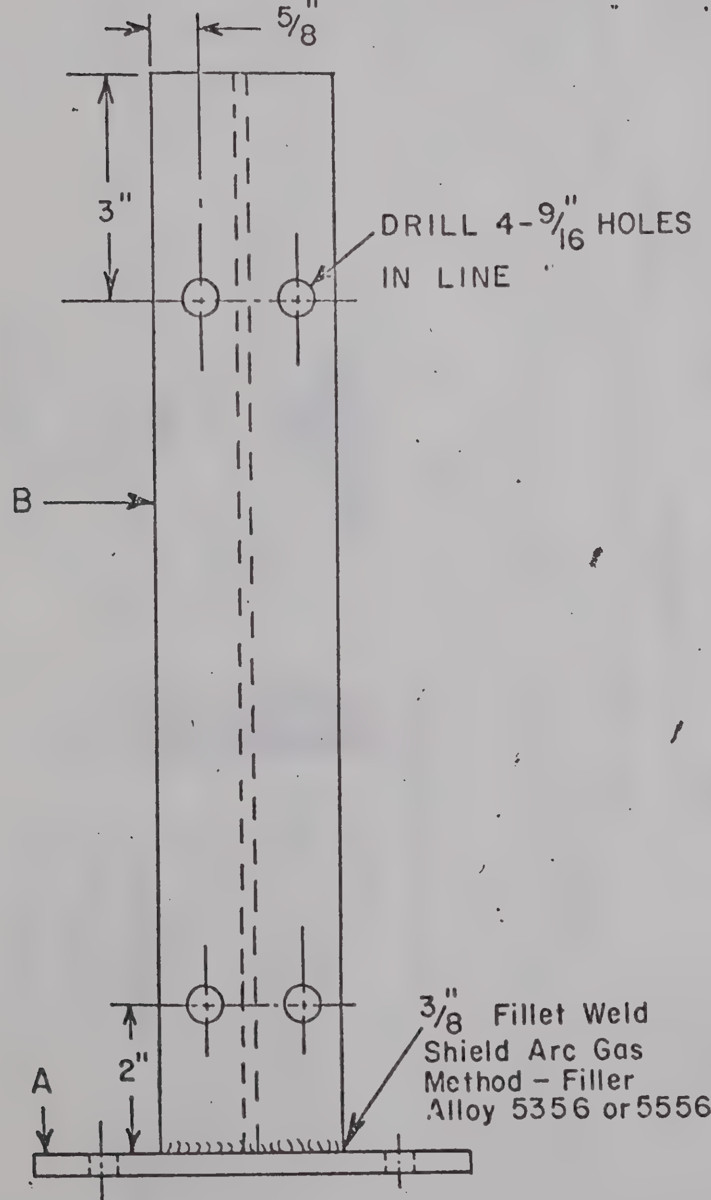
Ⓐ BASE PLATE
6061 ALUM.



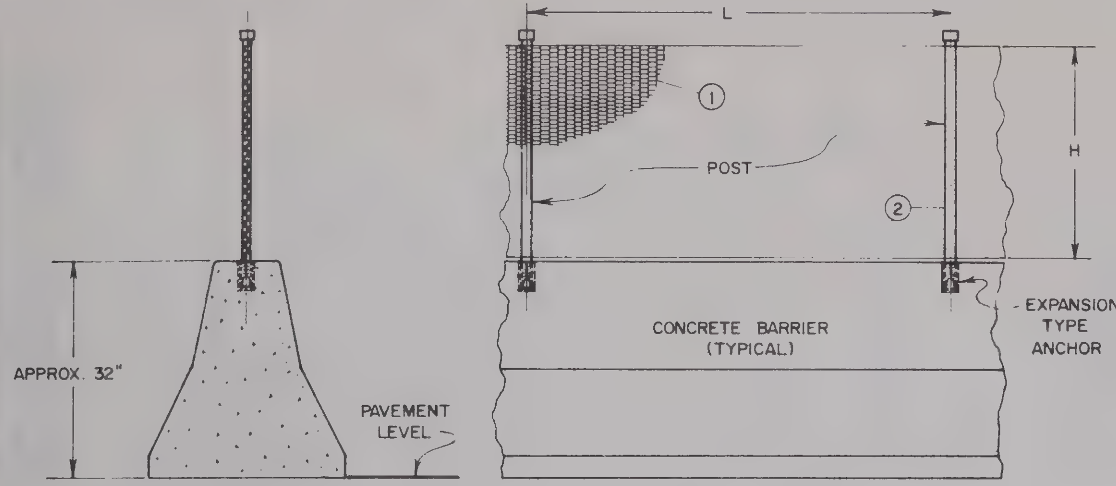
Ⓑ SECTION 1 1/2" x 2 1/2" x 1/8"
6061 – ALUM.

GLARE SCREEN POST DETAILS





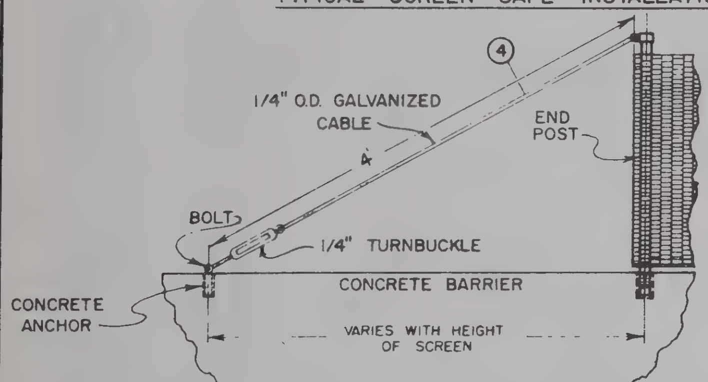
ASSEMBLY OF GLARE SCREEN POST



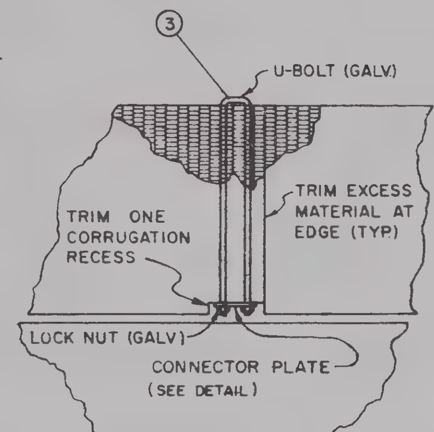
TYPICAL SCREEN SAFE INSTALLATION

PARTS LIST		
Nº	DESCRIPTION	QTY
1	DRC FABRIC H=	
2	POST & CONC ANCHOR SETS DIA L'TH	
3	CONNECTION SETS DIA. L'TH (U-BOLT, 2 NUTS, CONNECTOR PLATE	
4	END POST ASSEMBLY	

STATION LOCATION	SCREEN HEIGHT H	POST SPACING L (SEE NOTE)	POST DIA.	POST LENGTH
EXAMPLE	24"	8'— 0"	3/4"	26"



END POST DETAIL



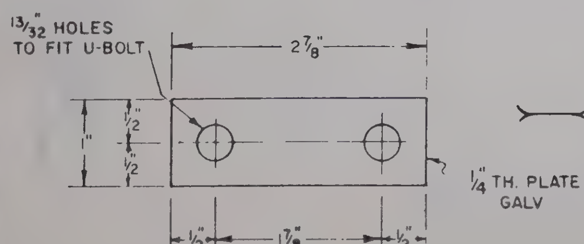
FABRIC CONNECTION DETAIL

GENERAL NOTES

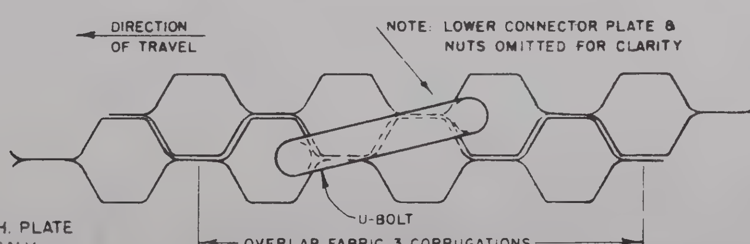
1. LENGTH "L" CAN BE VARIED TO AVOID POSITIONING POSTS CLOSE TO ENDS OF CONCRETE SECTIONS.
2. FABRIC JOINTS CAN ALTERNATIVELY BE MADE BY FLATTENING ENDS OF FABRIC, OVERLAPPING AND USING METAL SCREWS.

INSTALLATION PROCEDURE

1. DRILL HOLES FOR CONCRETE EXPANSION ANCHORS AND POSITION ANCHORS.
2. THREAD END POST THROUGH FABRIC AND INSTALL BRACING HARDWARE
3. STRETCH FABRIC APPROX. 3' TO 5 AND INSTALL INTERMEDIATE POSTS.
4. CONNECT ROLLS OF FABRIC USING FABRIC CONNECTION SYSTEM.
5. END FENCE WITH END POST AND BRACING SYSTEM.



CONNECTOR PLATE DETAIL



TOP VIEW

FABRIC CONNECTION DETAIL (TYPICAL)

Nº	DESCRIPTION OF REVISION	BY	DATE
1	FABRIC CONN. DETAILS	C	5/77

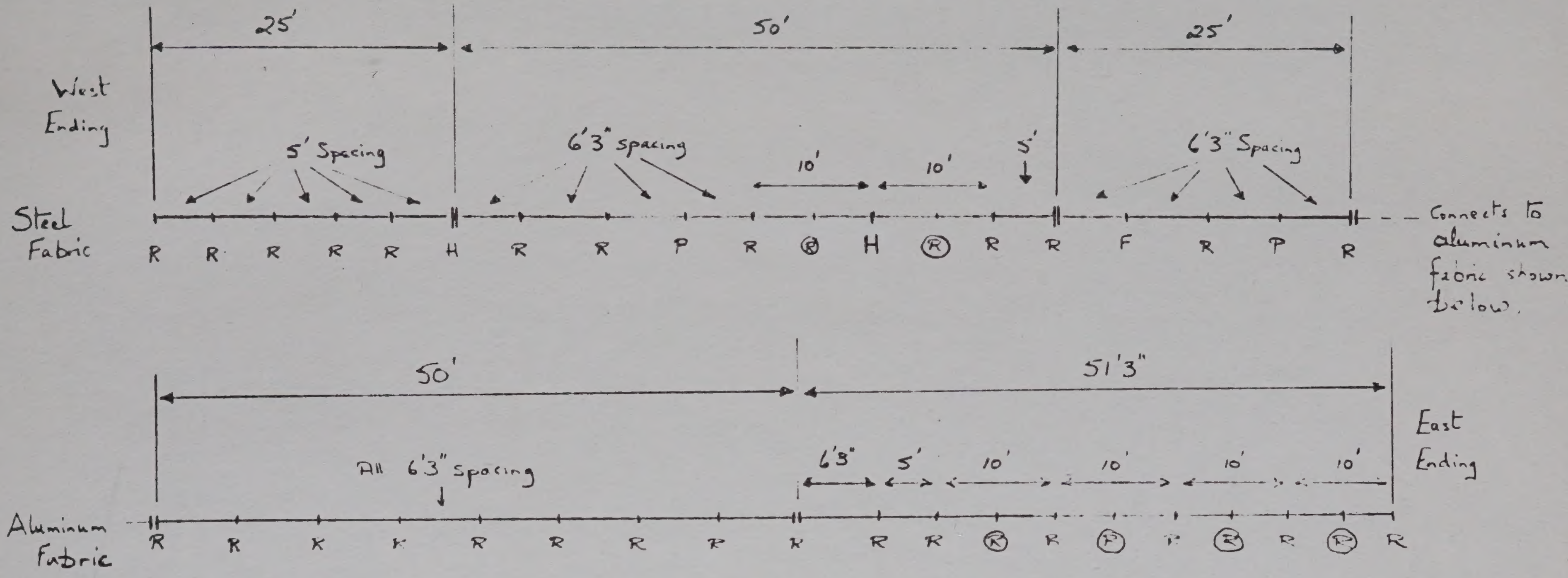
transpo-safety, inc.

SCREEN-SAFE
DRC - FABRIC

HEADLIGHT GLARE SCREEN INSTALLATION ON CONCRETE MEDIAN BARRIER

SUBMITTED R. HORNE | SCALE NTS | DATE 11/1/76
APPROVED A. M. DI NITZ | DWG Nº 4-001

APPENDIX "C"



Anchorage:

R = 3" Coupling/Nipple + Grout. + 14" Pipe

Ⓡ = 3" Coupling/Nipple + Grout No pipe inserted.

H = 3/4" Hilti anchor + 3/4" threaded rod.

P = Plate with threaded pipe hole, held down with 2 1/4" anchor bolts.

F = Pipe flange plate held with 4 concrete screws.

All fabric joints shown || are made with bottom plate with two holes, one threaded and one unthreaded through which pipe can fit into anchorage. Top of two pipes held together with thin breakaway plate.

R. Horne 7/1/76.

Installation of DRC Fabric Glare Screen
New Jersey. Rt 22

transpo-safety, inc.
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